

AMENDMENTS TO THE CLAIMS

Claim 1. (Currently Amended) An oxygen barrier composition, comprising:

a oxygen barrier polymer, an oxygen scavenging polymer, and an oxidation catalyst, wherein the oxygen barrier polymer is selected from poly(ethylene/vinyl alcohol) (EVOH), polyacrylonitrile (PAN), copolymers comprising acrylonitrile, or poly(vinylidene dichloride) (PVDC), ~~or polyamides not derived from xylylene diamine-based monomers~~; and the oxygen scavenging polymer is a polyamide oligomer or polymer derived at least in part from a xylylene diamine-based monomer.

Claim 2. (Previously Amended) The composition of claim 1, wherein the oxygen scavenging polymer comprises from about 10 mol% to about 50 mol% units derived from a xylylene diamine-based monomer.

Claim 3. (Original) The composition of claim 1, wherein the oxygen scavenging polymer comprises from about 1% to about 30% of the blend by weight.

Claim 4. (Original) The composition of claim 1, wherein the oxygen scavenging polymer is MXD6.

Claim 5. (Original) The composition of claim 1, wherein the composition has an oxygen transmission rate at least 2 times lower than that of the oxygen barrier polymer alone.

Claim 6. (Original) The composition of claim 1, wherein the oxidation catalyst comprises a transition metal selected from cobalt, copper, nickel, iron, manganese, rhodium, or ruthenium.

Claim 7. (Original) The composition of claim 6, wherein the oxidation catalyst is a salt comprising a counterion selected from C₁-C₂₀ alkanoates.

Claim 8. (Original) The composition of claim 7, wherein the transition metal salt is cobalt oleate, cobalt stearate, or cobalt neodecanoate.

Claim 9. (Original) The composition of claim 1, further comprising a photoinitiator.

Claim 10. (Original) The composition of claim 9, wherein the photoinitiator is selected from benzophenone derivatives containing at least two benzophenone moieties and having the formula:



wherein

A is a bridging group selected from sulfur; oxygen; carbonyl; $-\text{SiR}''_2-$, wherein each R'' is individually selected from alkyl groups containing from 1 to 12 carbon atoms, aryl groups containing 6 to 12 carbon atoms, or alkoxy groups containing from 1 to 12 carbon atoms; $-\text{NR}'''-$, wherein R''' is an alkyl group containing 1 to 12 carbon atoms, an aryl group containing 6 to 12 carbon atoms, or hydrogen; or an organic group containing from 1 to 50 carbon atoms;

a is an integer from 0 to 11;

B is a substituted or unsubstituted benzophenone group; and

b is an integer from 2 to 12.

Claim 11. (Original) The composition of claim 10, wherein the photoinitiator is selected from dibenzoyl biphenyl, substituted dibenzoyl biphenyl, benzoylated terphenyl, substituted benzoylated terphenyl, tribenzoyl triphenylbenzene, substituted tribenzoyl triphenylbenzene, benzoylated styrene oligomer, or substituted benzoylated styrene oligomer.

Claim 12. (Original) The composition of claim 1, further comprising an antioxidant.

FAX RECEIVED

MAY 08 2003

GROUP 1700

B/Cmt

B

Claim 13. (Original) The composition of claim 12, wherein the antioxidant is selected from 2,6-di(t-butyl)-4-methylphenol(BHT), 2,2'-methylene-bis(6-t-butyl-p-cresol), triphenylphosphite, tris-(nonylphenyl)phosphite, vitamin E, tetra-bismethylene 3-(3,5-ditertbutyl-4-hydroxyphenyl)-propionate methane, or dilaurylthiodipropionate.

Claim 14. (Currently Amended) A packaging article, comprising:

(a) at least one oxygen barrier layer comprising an oxygen barrier polymer and an oxygen scavenging polymer, wherein the oxygen barrier polymer is selected from poly(ethylene/vinyl alcohol) (EVOH), polyacrylonitrile (PAN), copolymers comprising acrylonitrile, or poly(vinylidene dichloride) (PVDC), ~~or polyamides not derived from xylylene diamine-based monomers~~; and the oxygen scavenging polymer is a polyamide oligomer or polymer derived at least in part from a xylylene diamine-based monomer; and

(b) a transition metal salt in the oxygen barrier layer or a layer adjacent to the oxygen barrier layer.

Claim 15. (Previously Amended) The packaging article of claim 14, wherein the oxygen scavenging polymer comprises from about 10 mol% to about 50 mol% units derived from a xylylene diamine-based monomer.

Claim 16. (Original) The packaging article of claim 14, wherein the oxygen scavenging polymer comprises from about 1% to about 30% of the blend by weight.

Claim 17. (Original) The packaging article of claim 14, wherein the oxygen scavenging polymer is MXD6.

[Claim 18. (Cancelled)]

¹⁸
Claim 19. (Currently Amended) The packaging article of claim ~~18~~ 14, wherein the transition metal is selected from cobalt, copper, nickel, iron, manganese, rhodium, or ruthenium.

¹⁹ Claim 20. (Original) The packaging article of claim ¹⁸19, wherein the transition metal salt comprises a counterion selected from C₁-C₂₀ alkanoates.

²⁰ Claim 21. (Original) The packaging article of claim ¹⁹20, wherein the transition metal salt is cobalt oleate, cobalt stearate, or cobalt neodecanoate.

²¹ Claim 22. (Original) The packaging article of claim ¹⁴14, further comprising a photoinitiator in the oxygen barrier layer.

²² Claim 23. (Original) The packaging article of claim ²¹22, wherein the photoinitiator is selected from benzophenone derivatives containing at least two benzophenone moieties and having the formula:



wherein

A is a bridging group selected from sulfur; oxygen; carbonyl; -SiR''²-, wherein each R'' is individually selected from alkyl groups containing from 1 to 12 carbon atoms, aryl groups containing 6 to 12 carbon atoms, or alkoxy groups containing from 1 to 12 carbon atoms; -NR'''-, wherein R''' is an alkyl group containing 1 to 12 carbon atoms, an aryl group containing 6 to 12 carbon atoms, or hydrogen; or an organic group containing from 1 to 50 carbon atoms;

a is an integer from 0 to 11;

B is a substituted or unsubstituted benzophenone group; and

b is an integer from 2 to 12.

²³ Claim 24. (Original) The packaging article of claim ²²23, wherein the photoinitiator is selected from dibenzoyl biphenyl, substituted dibenzoyl biphenyl, benzoylated terphenyl, substituted benzoylated terphenyl, tribenzoyl triphenylbenzene, substituted tribenzoyl triphenylbenzene, benzoylated styrene oligomer, or substituted benzoylated styrene oligomer.

FAX RECEIVED

MAY 08 2003

GROUP 1700

²⁴
Claim 25. (Original) The packaging article of claim 14, further comprising an antioxidant in the oxygen barrier layer.

²⁵
Claim 26. (Original) ²⁴ The packaging article of claim 25, wherein the antioxidant is selected from 2,6-di(t-butyl)-4-methylphenol(BHT), 2,2'-methylene-bis(6-t-butyl-p-cresol), triphenylphosphite, tris-(nonylphenyl)phosphite, vitamin E, tetra-bismethylene 3-(3,5-ditertbutyl-4-hydroxyphenyl)-propionate methane, or dilaurylthiodipropionate.

²⁶
Claim 27. (Previously Amended) The packaging article of claim 14, further comprising an oxygen barrier layer, wherein the oxygen barrier layer does not comprise a polyamide derived at least in part from a xylylene diamine-based monomer.

²⁷
Claim 28. (Currently Amended) ²⁶ The packaging article of claim 27, wherein the oxygen barrier layer not comprising a polyamide derived at least in part from a xylylene diamine-based monomer comprises poly(ethylene vinyl alcohol) (EVOH), polyacrylonitrile (PAN), a copolymer comprising acrylonitrile, poly(vinylidene dichloride) (PVDC), polyethylene terephthalate (PET), or polyethylene naphthalate (PEN), ~~or polyamide other than MXD6.~~

²⁸
Claim 29. (Original) The packaging article of claim 14, further comprising a structural layer.

²⁹
Claim 30. (Original) ²⁸ The packaging article of claim 29, wherein the structural layer comprises PET, polyamide, polypropylene, polyethylene, low density polyethylene, very low density polyethylene, ultra-low density polyethylene, high density polyethylene, polyvinyl chloride, ethylene-vinyl acetate, ethylene-alkyl (meth)acrylates, ethylene-(meth)acrylic acid, ethylene-(meth)acrylic acid ionomers, paperboard, or cardboard.

[Claims 31-34. (Withdrawn)]

FAX RECEIVED

MAY 08 2003

GROUP 1700

Serial No. 09/800,418
Response to Final Office Action
Dated March 26, 2003

34
Claim 35. (Original) The packaging article of claim 14, wherein the packaging article is in the form of a single layer flexible article, a multilayer flexible article, a single layer rigid article, or a multilayer rigid article.

35
Claim 36. (Currently Amended) A method of making an oxygen barrier composition comprising an oxygen barrier polymer, an oxygen scavenging polymer, and an oxidation catalyst, wherein the oxygen barrier polymer is selected from poly(ethylene/vinyl alcohol) (EVOH), polyacrylonitrile (PAN), or copolymers comprising acrylonitrile, poly(vinylidene dichloride) (PVDC), ~~or polyamides not derived from xylylene diamine-based monomers~~; and the oxygen scavenging polymer is a polyamide oligomer or polymer derived at least in part from a xylylene diamine-based monomer:

providing the oxygen barrier polymer, the polyamide derived at least in part from a xylylene diamine-based monomer, and the oxidation catalyst; and

blending the oxygen barrier polymer, the polyamide, and the oxidation catalyst, to form the oxygen barrier composition.

36
Claim 37. (Original) The method of claim 36, wherein the oxygen scavenging polymer comprises from about 1% to about 30% of the blend by weight.

37
Claim 38. (Original) The method of claim 36, wherein the oxygen scavenging polymer is MXD6.

38
Claim 39. (Original) The method of claim 36, wherein the blending occurs during a reactive extrusion.

39
Claim 40. (Currently Amended) A method of forming an oxygen barrier layer in a packaging article, comprising:

providing an oxygen barrier composition comprising an oxygen barrier polymer and an oxygen scavenging polymer, wherein the oxygen barrier polymer is selected from poly(ethylene/vinyl alcohol) (EVOH), polyacrylonitrile (PAN), copolymers

MAY 08 2003

GROUP 1700

comprising acrylonitrile, or poly(vinylidene dichloride) (PVDC), ~~or polyamides not derived from xylylene diamine-based monomers~~; and the oxygen scavenging polymer is a polyamide oligomer or polymer derived at least in part from a xylylene diamine-based monomer;

forming the composition into the packaging article or an oxygen barrier layer thereof; and forming a transition metal salt into the oxygen barrier layer or a layer adjacent to the oxygen barrier layer of the packaging article.

⁴⁰
Claim ~~41~~. (Original) The method of claim ~~40~~³⁹, wherein the oxygen scavenging polymer comprises from about 1% to about 30% of the composition by weight.

⁴¹
Claim ~~42~~. (Original) The method of claim ~~40~~³⁹, wherein the oxygen scavenging polymer is MXD6.

⁴²
Claim 43. (Cancelled)]

⁴³
Claim ~~44~~. (Original) The method of claim ~~40~~³⁹, wherein the oxygen barrier layer further comprises a photoinitiator.

⁴⁴
Claim ~~45~~. (Original) The method of claim ~~40~~³⁹, wherein the oxygen barrier layer further comprises an antioxidant.

⁴⁵
Claim ~~46~~. (Previously Amended) The method of claim ~~40~~³⁹, wherein the forming step further comprises forming an oxygen barrier layer in the packaging article, wherein the oxygen barrier layer does not comprise a polyamide derived at least in part from a xylylene diamine-based monomer.

⁴⁶
Claim ~~47~~. (Original) The method of claim ~~40~~³⁹, wherein the forming step further comprises forming a structural layer in the packaging article.

B

⁴⁶
Claim 48. (Original) The method of claim ³⁹40, wherein the forming step further comprises forming an oxygen scavenging layer in the packaging article.

Bo
med
⁴⁷
Claim 49. (Original) The method of claim ³⁹40, wherein the forming step further comprises forming the packaging article as a single layer flexible article, a multilayer flexible article, a single layer rigid article, or a multilayer rigid article.

FAX RECEIVED
MAY 08 2003
GROUP 1700

FAX RECEIVED
MAY 08 2003
GROUP 1700